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Evaluation of the mutagenicity and antimutagenicity of soy phytoestrogens using micronucleus and comet assays of the peripheral blood of mice

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ABSTRACT. Studies show that soy imparts many favorable properties in the human body, including the prevention of chronic diseases such as osteoporosis, heart disease, cancer, and diabetes. Soy is rich in isoflavones, and it is a candidate for the chemoprevention of diseases owing to its low toxicity. In this study, a soy phytoestrogen (with high levels of the isoflavones genistin and daidzein) was tested in mice to investigate its mutagenicity and genotoxicity using micronucleus and comet assays of mouse peripheral blood. Phytoestrogen (0.083, 0.83 and 8.3 mg/kg body weight) was evaluated with and without the chemotherapeutic agent cyclophosphamide. For the micronucleus assay, blood was collected

before treatment and after 24 and 48 h. For the comet assay, blood was collected only after 24 h. Phytoestrogen was not mutagenic and reduced cyclophosphamide-induced DNA damage. The results from the comet assay revealed a reduction of DNA damage; however, phytoestrogen did induce genotoxic damage during the 24-h treatment. This genotoxic damage could have been repaired and was therefore not identified in the micronucleus assay, which detects mutations. The results suggested that the reduction of DNA damage observed in associated treatments could also reduce the side effects of chemotherapy. Moreover, they suggested that phytoestrogen might be a candidate of interest for the chemoprevention of cancer because it protects against DNA damage.

Key words: Phytoestrogen; Mutagenicity; Antimutagenicity; *In vivo*

